PATENT APPLICATION

IN THE U.S. PATENT AND TRADEMARK OFFICE

Appellants:	Vladimir PAVLOVIC et al.
Application No.:	09/989,940
Art Unit:	2838
Filed:	November 21, 2001
Examiner:	Lawrence W. Luk
For:	METHOD AND APPARATUS FOR AMELIORATING ELECTROLYTE STRATIFICATION DURING RAPID CHARGING
Attorney Docket No.:	23390-000103/US

APPELLANTS' BRIEF ON APPEAL UNDER 37 C.F.R. §41.37

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

November 2, 2004

Sir:

In accordance with the provisions of 37 C.F.R. §41.37, Appellants submit the following:

I. REAL PARTY IN INTEREST:

The real party in interest in this appeal is Edison Source. Assignment of the application was submitted to the U.S. Patent and Trademark Office on September 17, 2003, and recorded on the same date at Reel 014509, Frame 0604.

II. RELATED APPEALS AND INTERFERENCES:

There are no known appeals or interferences that will affect, be directly affected by, or have a bearing on the Board's decision in this Appeal.

III. STATUS OF CLAIMS:

Claims 3-10 and 14-24 are pending in the application, with claims 4, 5, 14, 15, 21, and 23 being written in independent form. Appellants canceled claims 1, 2, 11, and 12 during prosecution.

Claims 4-10 and 14-20 are allowed, and claims 3 and 13 would be allowed if they were rewritten independent form.

Claims 21-24 remain finally rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,307,001 to Heavey ("Heavey"). Thus, of the pending claims, only claims 21-24 are on appeal, and these claims are set forth in the attached Appendix.

IV. STATUS OF AMENDMENTS:

No amendments were requested subsequent to the non-final rejection in the May 12, 2004 Office Action.

V. SUMMARY OF CLAIMED SUBJECT MATTER:

Independent claim 21 is written in an apparatus format and independent claim 23 is written in a method format. Both claims are directed to recharging batteries while ameliorating a stratification phenomenon in which acid concentrations may lead to portions of the battery being less charged with every charge cycle.[1] To this end, an overcharge pulse may be supplied to the battery during the charging

[1] Spec., p. 6, l. 23-25, noting that the blank lines (i.e., without any text) on the page have been counted.

process.[2] The overcharge pulse may be achieved by increasing the current supplied to the battery from a charge current to an overcharge current that exceeds the charge acceptance ability ("CAA") of the battery.[3] The CAA, which is a well known term of art, is the maximum rate at which a battery can accept current at any given moment without being overcharged.[4] The applied overcharge current mixes the electrolyte in the battery, thereby implementing a destratification procedure.[5]

As noted above, the overcharge current is applied during the charging cycle. Thus, the overcharge current may be considered as having the following two components: (1) a charging component (or charging current) equal to the CAA of the battery; and (2) an additional component (or overcharge current increment).[6] The charging current may charge the battery, i.e., reverse the chemical reaction that the battery uses to produce electricity; and the overcharge current increment may implement the destratification procedure.

A. Claim 21:

Claim 21 includes several means plus function features permitted by 35 U.S.C. §112(6th). An exemplary, non-limiting embodiment of the various means is schematically depicted in Fig. 11. The means plus function features include:

(1) "Generator means" ... corresponding to the power supply 16 that may generate the current 18 for charging the battery 20.[7]

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[2] *Id.*

[3] Spec., p. 6, l. 27 – p. 7, l. 1.

[4] Spec., p. 10, l. 20-22.

[5] Spec., p. 23, l. 1-6.

[6] Spec., p. 24, l. 15-19.

[7] Spec., p. 7, l. 19-20.

(2) "Controller means" ... corresponding to the controller 12 that may include a microprocessor programmed to execute a charging program and stratification control method.[8] The battery charging program may include numerous functional blocks, inclusive of a charging control module 102.[9] The charging control module 102 (as implemented on the controller 12) may perform various procedures and functionality corresponding to claimed means. Accordingly,

(2a) "Feed back means" reads on the controller 12 performing the charge acceptance ability procedure 400 (see Fig. 6), which may determine the charge acceptance ability of the battery;[10]

(2b) "Overcharge instruction means" reads on the controller 12 performing the destratification procedure 700 (see Fig. 12), which may determine (at logic block 719) an overcharge increment to be added to the charging current to obtain the overcharge current;[11] and

(2c) "Current control means" reads on the controller 12 performing the destratification procedure 700 (see Fig. 12), which may (at logic block 720) execute overcharge instructions.[12]

B. Claim 23:

Claim 23 is directed to a method and none of the recited features are set forth in a step plus function format. The functional features defined by claim 23 are discussed above.

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[8] Spec., p. 8, l. 10-12.

[9] Spec., p. 10, l. 30 – p. 11., l. 4.

[10] Spec., p. 15, l. 16-21.

[11] Spec., p. 26, l. 12-19.

[12] Spec., p. 27, l. 7-11.

VI. Grounds of Rejection to be Reviewed on Appeal:

Appellants seek the Board's review of the rejection of claims 21-24 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,307,001 to Heavey ("Heavey").

VII. ARGUMENTS:

A. The Anticipation Rejection Based on Heavey:

i. Independent Claim 21 – The Apparatus:

Independent claims 21 defines (among other things): (1) determining an overcharge current "exceeding the charge acceptance ability of the battery;" and "current control means ... operable to deliver the overcharge current to the battery during charging." Put differently, the claimed apparatus performs functionality that involves delivering an overcharge current (inclusive of a charging current and an overcharge current increment) to the battery during charging. At least these feature (as recited in claim 21), in combination with the other features defined by claim 21, are not taught or suggested by the prior art relied upon by the Examiner.

The Examiner relies upon the Heavey reference to teach each and every feature of the present invention. This rejection position should be reversed for the following reasons.

Heavey discloses a method and apparatus for detecting the gassing point of a battery during its charging cycle.[13] Once the gassing point is detected, the charging may continue for an "overcharge period."[14] In one embodiment, the overcharge period may last for a duration of four hours to finish charging the battery to capacity.[15] In this regard, Heavey's

[13] Heavey, col. 4, l. 38-41.

[14] Heavey, col. 4, l. 42-44.

[15] Heavey col. 8, l. 55-64.

overcharge feature relates to an overcharge duration (or time period). Heavey does not, however, provide any indication that the current applied during the overcharge duration is an overcharge current (inclusive of a charging current and an overcharge current increment) that exceeds the CAA of the battery. In fact, Heavey at least indirectly indicates the opposite.

Specifically, Fig. 16 of Heavey illustrates the ampere time characteristics of the charger. Here, the two curves sloping downward (from right to left) clearly show the amperes continuously dropping as the batteries A, B approach a 100% charge condition.[16] Heavey also indicates that the battery is charged according to the Ampere-Hour law so that the charge rate is kept below a value equal to the number of hours to be returned.[17] Accordingly, as Heavey's charge cycle progresses, the applied current may decrease, but it may not increase (e.g., to apply an overcharge current having a magnitude above that of the normal charging rate). Furthermore, Heavy indicates (albeit as background) that an "acceptable recharge rate should decrease as charging progresses due to reduced charge acceptance by the battery."[18] Heavy does not provide any indication that the disclosed charging technique departs from this aspect of conventional wisdom. The Examiner's assertions to the contrary are tenable only by placing a strained interpretation of the reference.

Turning to the next point, the Examiner cites a portion of the Heavy reference (specifically claim 7) as allegedly teaching the overcharge current feature of the claimed invention. The heavy reliance upon claim 7 of Heavey is misplaced. This is because the only mention of current flow to the battery appearing in claim 7 is that "activation of the DC power

[16] Heavey, col. 9, l. 29-37.

[17] Heavey, col. 9, l. 44-51.

[18] Heavey, col. 2, l. 28-30.

ON/OFF signal initiates a flow of charge current to the battery from the battery charger."[19] Claim 7 does not, however, provide any indication regarding the rate (or magnitude) of the charge current, much less that the charge current exceeds the charge acceptance ability of the battery.

Therefore, Heavy does not teach or suggest determining an overcharge current "exceeding the charge acceptance ability of the battery;" and "current control means ... operable to deliver the overcharge current to the battery during charging" as recited in claim 21, and cannot anticipate or render claim 21 obvious to one skilled in the art.

ii. Independent Claim 23 – The Method:

Independent claims 23 defines a method that involves (among other things): (1) determining an overcharge current ... "exceeding the charge acceptance ability of the battery;" (2) determining an overcharge current increment to be added to the charging current to yield the overcharge current; and (3) during step (b) (i.e., supplying charging current to the battery), "supplying the overcharge current increment to the battery." Put differently, the claimed method involves delivering an overcharge current (inclusive of a charging current and an overcharge current increment) to the battery during charging. As clear from the discussion of claim 21 above, at least these feature (as recited in claim 23), in combination with the other features defined by claim 23, are not taught or suggested by the prior art relied upon by the Examiner.

iii. Conclusion:

In conclusion, Heavy's overcharge feature relates to time. The reference does not, however, teach or suggest a charging cycle in which the charging current is increased by an overcharge current increment to yield an overcharge current that exceeds the charge acceptance ability of the

[19] Heavey, col. 17, l. 30-32.

battery. Accordingly, Appellants respectfully request the Board to reverse the Examiner's anticipation rejection of claims 21-24.

Pursuant to 37 C.F.R. 1.17 and 1.136(a), the Appellants respectfully petition for a one (1) month extension of time for filing a response in connection with the present application, and the required fee of $110.00 is attached.

The Commissioner is authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNESS, DICKEY, & PIERCE, P.L.C.

By: 

Ray Heflin, Reg. No. 41,060
P.O. Box 8910
Reston, Virginia 20195
(703) 668-8000

GDY/HRH:ewd

CLAIMS APPENDIX

Claims 21-24 on Appeal:

21. An apparatus for charging a rechargeable lead-acid battery, said apparatus comprising:

generator means for generating a charging current for charging the battery, and an overcharge current increment to be added to the charging current to yield an overcharge current; and,

controller means for controlling said generator means, said controller means including

(a) feed back means for determining at least one of a charge acceptance ability and a state of charge of the rechargeable lead-acid battery during recharging;

(b) overcharge instruction means for determining the overcharge current, the overcharge current exceeding the charge acceptance ability of the battery; and,

(c) current control means for controlling the generator to supply the charging current and the overcharge current increment, the current control means being operable to deliver the overcharge current to the battery during charging.

22. The apparatus as defined in claim 21 wherein

the overcharge instruction means is operable to determine an overcharge duration and an overcharge time; and,

the current control means is operable to deliver the overcharge current to the battery for the overcharge duration at the overcharge time.

23. A method for recharging a rechargeable lead-acid battery, the method comprising:

(a) generating a charging current for charging the battery;

(b) supplying the charging current to the battery;

(c) determining at least one of a charge acceptance ability and a state of charge of the rechargeable lead-acid battery; and

(d) determining an overcharge current, the overcharge current exceeding the charge acceptance ability of the battery;

(e) determining an overcharge current increment to be added to the charging current to yield the overcharge current; and

(f) during step (b), supplying the overcharge current increment to the battery.

24. The method as defined in claim 23, wherein

an overcharge duration and an overcharge time are determined;

the overcharge current is supplied to the battery for the overcharge duration at the overcharge time.